

What is claimed:

1. A refractory nozzle for use in the casting of molten metal having an inlet, an outlet fluidly connected to the inlet, an outer surface, an inner surface defining a bore between the inlet and the outlet, and a top surface surrounding the inlet, the nozzle adapted to receive a flow of inert gas and characterized by:
  - a) a substantially gas-impervious refractory composition lining at least a portion of the inner surface; and
  - b) a gas-permeable refractory composition surrounding at least a portion of the gas-impervious composition, the permeable composition having a porosity sufficient to permit diffusion of inert gas.
2. The refractory nozzle of claim 1, further characterized by the gas-permeable composition having a porosity of at least 15%.
3. The refractory nozzle of any one of the preceding claims, further characterized by the permeable composition including an open-cell pore structure and an average pore size of at least one micron.
4. The refractory nozzle of any one of the preceding claims, further characterized by the permeable refractory composition selected from the group consisting of carbon-bonded refractories, oxide-bonded refractories, resin-bonded refractories, castable refractories and mixtures thereof.
5. The refractory nozzle of any one of the preceding claims, further characterized by the gas-impervious refractory composition selected from the group consisting of carbon-bonded refractories, oxide-bonded refractories, resin-bonded refractories, castable refractories and mixtures thereof.
6. The refractory nozzle of any one of the preceding claims, further characterized

by the gas-impervious composition including oxygen getters.

7. The refractory nozzle any one of the preceding claims, further characterized by the gas-impervious composition comprising a resin-bonded refractory comprising 50-90 wt.% refractory aggregate, 1-10 wt.% binder, and 0.5-15 wt.% reactive metal.

8. The refractory article of claim 7, further characterized by the refractory aggregate comprising at least one refractory material selected from the group consisting of alumina, zirconia, calcia, magnesia, silica, and mixtures and compounds thereof.

9. The refractory nozzle of any one of claims 7 and 8, characterized by the reactive metal comprising at least one metal selected from the group consisting of aluminum, magnesium, silicon, titanium, and mixtures and alloys thereof.

10. The refractory article of any one of the preceding claims, characterized by the gas-impervious refractory composition made from a mixture comprising 65-80 wt.% fused alumina, 2-30 wt.% calcined alumina, 1-10 wt.% binder, 0.5-10 wt.% aluminum metal, up to 15 wt.% zirconia, and less than 3 wt.% silica.

11. The refractory nozzle of any one of the previous claims, further characterized by the nozzle including an inert gas delivery system.

12. The refractory nozzle of claim 11, characterized by the gas delivery system being selected from the group consisting of channels, grooves and devices.

13. The refractory nozzle of any one of the preceding claims, further characterized by a metal housing at least partially encasing the outer surface of the nozzle.

14. The refractory nozzle of any one of the preceding claims, further characterized by the permeable composition extending to the top surface, whereby inert gas

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can purge the molten metal when pressure of the inert gas exceeds ferrostatic head in the molten metal.